

A NEW CRAYFISH (DECAPODA: CAMBARIDAE)
FROM SAN LUIS POTOSÍ, MEXICO

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The occurrence of the crayfish described herein in San Luis Potosí represents an extension of the southern limit of the range of the Subgenus *Scapulicambarus* (those members of the genus *Procambarus* in which the male possesses hooks on the ischia of the third and fourth pereopods and the first pleopod bears a distinct shoulder on the cephalic surface some distance proximal to the terminal elements). Only one other member of the subgenus, *Procambarus* (*S.*) *clarkii* (Girard, 1852), has been reported from Mexico. Hobbs (1962:273, 275) recorded its presence in the states of Chihuahua and Sonora.

Specimens of the new species were obtained by Ned E. Strenth of the Marine Biomedical Institute, Galveston, Texas, and Thomas G. Littleton, of the University of Texas Health Science Center, San Antonio, from a small stream in the Panuco River basin, 15 miles (24 kilometers) west of Ciudad Valles. I wish to thank them for donating these crayfish to the Smithsonian and for permitting me to describe the species. Appreciation is also extended to Fenner A. Chace, Jr., and Isabel Pérez Farfante for their criticisms of the manuscript.

Procambarus (*Scapulicambarus*) *strenthi*, new species

Figs. 1-2

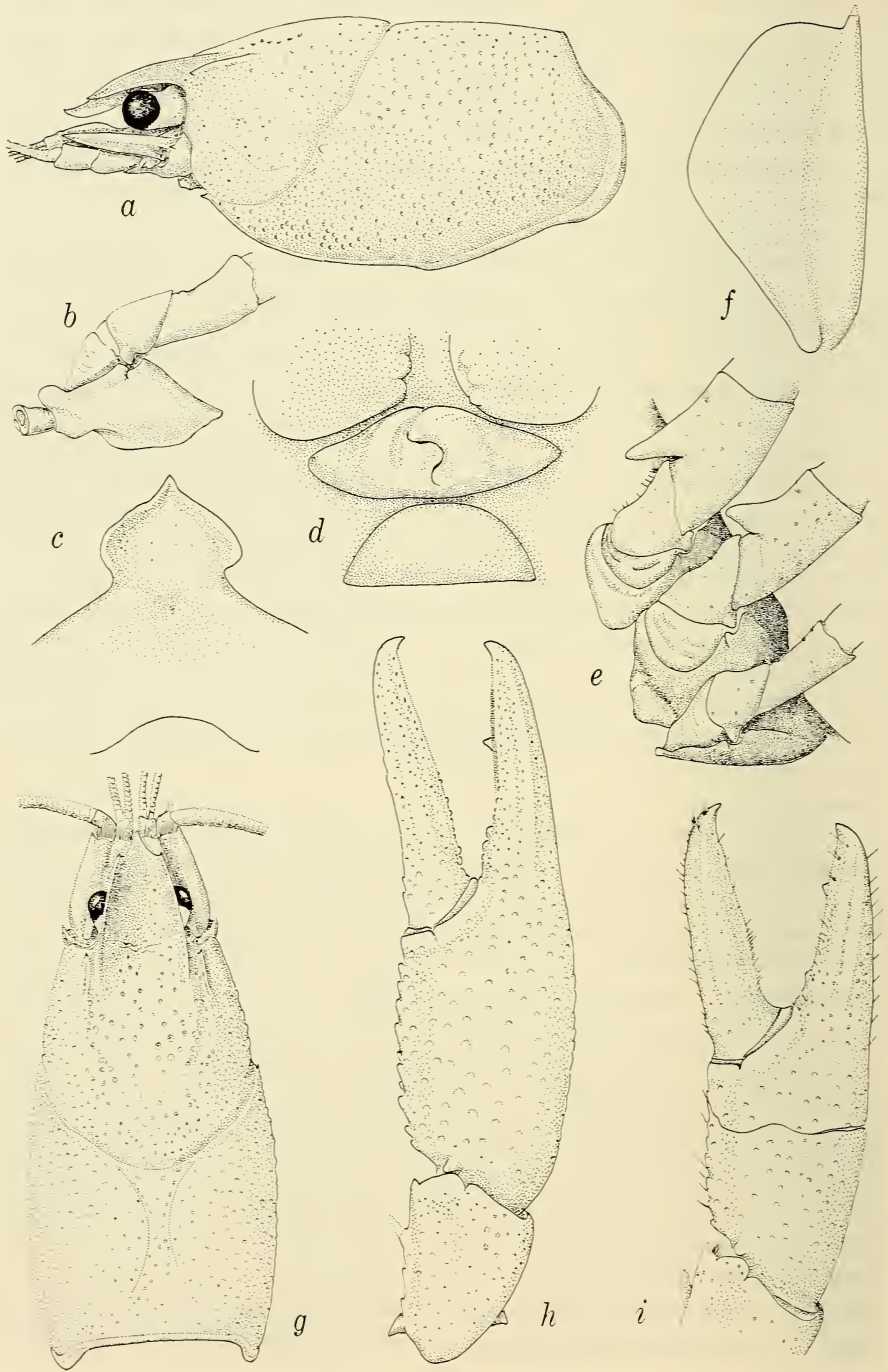
Diagnosis.—Body pigmented, eyes well developed. Rostrum with small marginal spines at base of short, broad, triangular acumen, median carina absent. Carapace usually with cervical spine or tubercle (multiple spines in one specimen). Areola 6.9 to 9.2 times as long as broad and constituting 33.2-35.5% of total length of carapace (41.6-44.6% of postorbital carapace length). Suborbital angle weak and rounded. Postorbital ridge with cephalic spine or tubercle. Hepatic area with tubercles; branchiostegal spine present. Antennal scale almost twice as long as broad, widest at mid-length. Ischia of third and fourth pereopods of first form male with simple hooks overreaching basioischial articulation, hook on neither appendage opposed by tubercle on corresponding basis; coxa of fourth pereopod with very prominent but thin boss on caudomesial ventral angle. First pleopods of first form male reaching coxa of third pereopod, strongly asymmetrical, bearing prominent angular shoulder on cephalic surface, and provided with subapical setae (plumose ones mesially and stiff simple ones laterally) largely obscuring terminal elements; latter consisting of strong acute mesial process directed distolaterally, broad delicate lamellate cephalic process with corneous margin partly surrounding large,

distally truncate, corneous, dentiform central projection, and smaller corneous, subtriangular caudal process arising from rudimentary caudal knob on caudolateral extremity of pleopod. Annulus ventralis almost 3 times as broad as long, almost symmetrical in outline, with median area elevated and bearing sinuous sinus, latter originating in oblique groove extending caudodextrally from cephalic median margin and terminating before reaching caudal margin of annulus; tongue broad and short. First pleopod present in female.

Holotypic male, form I.—Cephalothorax (Fig. 1a, g) subcylindrical, greatest width little more than height at caudodorsal margin of cervical groove. Abdomen slightly narrower than thorax (10.9 and 11.7 mm). Areola 9.2 times as long as wide with 1 or 2 widely spaced punctations across narrowest part. Cephalic section of carapace almost 3 times as long as areola, latter comprising 34.2% of entire length of carapace (43.5% of postorbital carapace length). Surface of carapace conspicuously punctate dorsally and tuberculate laterally except in orbital region where punctate. Rostrum broad basally, with weakly convergent margins bearing small marginal spines at level of midlength of penultimate podomere of antennular peduncle, acumen reaching midlength of ultimate podomere; margins not thickened and not conspicuously elevated; upper surface concave, sparsely marked by small punctations anteriorly and larger ones basally. Subrostral ridge very weak and scarcely evident in dorsal view. Postorbital ridge moderately well developed, grooved dorsolaterally, and terminating cephalically in small spine. Suborbital angle weak and rounded. Branchiostegal spine moderately well developed. Cervical spine represented by tubercle.

Abdomen longer than carapace (26.8 and 24.3 mm). Pleura of third through fifth abdominal segments subtruncate ventrally and rounded caudoventrally. Cephalic section of telson with 3 spines (mesialmost on right vestigial) in each caudolateral corner, lateral and mesial spines immovable. Cephalic lobe of epistome (Fig. 1c) broadly subtriangular with cephalomedian projection; median part somewhat convex (ventrally) and bearing widely spaced setae; median fovea on main body of epistome distinct and rather deep; epistomal zygoma broadly arched. Mesioventral surface of proximal podomere of antennular peduncle with strong spine at about midlength. Antennular peduncle with spines on basis and ischium; flagellum broken, but in paratypic male reaching caudally to fourth abdominal tergum. Antennular scale (Fig. 1f) 1.9 times as long as broad, widest at midlength; greatest width of lamellar area about 1.7 times that of thickened lateral part.

Third maxilliped extending to level of distal end of proximal podomere of antennular peduncle; ischium with distolateral extremity angular



but not produced, its lateral half bearing scattered tufts of short simple setae; mesial half with clusters of stiff setae.

Right chela (Fig. 1*h*) subovate in cross section, not strongly compressed. Entire palm with squamous tubercles, mesial surface with several irregular rows, mesialmost consisting of 8. Both fingers with low longitudinal ridge (that on dactyl somewhat indistinct) flanked proximally by tubercles and by punctations along most of length. Opposable margin of fixed finger with row of 8 (7 on left) tubercles (second and third from base larger) along proximal half, large tubercle situated more ventrally slightly distal to midlength, and broad band of minute denticles present along almost entire length of finger. Opposable margin of dactyl with 2 rows of tubercles: dorsal row of 10 extending along basal half, and ventral row of 3 (left with only 2) along proximal fourth of finger; very broad band of minute denticles extending along distal four-fifths of margin.

Carpus of cheliped longer than broad, lacking usual oblique furrow on dorsal surface; mesial surface with only 1 tubercle conspicuously larger than others nearby, and subacute tubercle present on dorsomesial distal angle; ventrodistal surface with usual 2 tubercles; remainder of podomere with setiferous punctations.

Merus tuberculate dorsally, distomesially, and ventrally; 1 dorsal tubercle large and more spiniform than others on dorsodistal surface; ventral surface with irregular mesial row of 14 tubercles, lateral one of 11, and 2 arranged obliquely between distal members of rows (left with 16, 12, and 3, respectively), also additional tubercles flanking rows, and spiniform tubercle on ventrolateral extremity. Ischium with row of 4 (3 on left) tubercles ventromesially.

Hooks on ischia of third and fourth pereopods (Fig. 1*e*) simple, both overreaching basioischial articulation, neither opposed by tubercle on corresponding basis. Coxa of fourth pereopod with moderately strong, vertically disposed caudomesial boss. Coxa of fifth with flattened (in longitudinal axis of body), prominent boss on ventral caudomesial angle.

Sternum between second, third, and fourth pereopods shallow, and setae extending from ventrolateral margins not conspicuous.

First pleopod (Fig. 2*a-e*, *g-i*) as described in "Diagnosis." In addition, proximomesial lobe of both members of pair unusually large, that of right extending mesially, caudal to and across, almost one-fourth caudal diameter of shaft of left member.

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Fig. 1. *Procambarus (Scapulicambarus) strenthi* (all illustrations from holotype except *d* and *i* from allotype): *a*, Lateral view of carapace; *b*, Caudal view of basal podomeres of fifth pereopod; *c*, Epistome; *d*, Annulus ventralis and adjacent sternal area; *e*, Basal podomeres of third, fourth, and fifth pereopods; *f*, Antennal scale; *g*, Dorsal view of carapace; *h*, *i*, Dorsal view of distal podomeres of right cheliped.

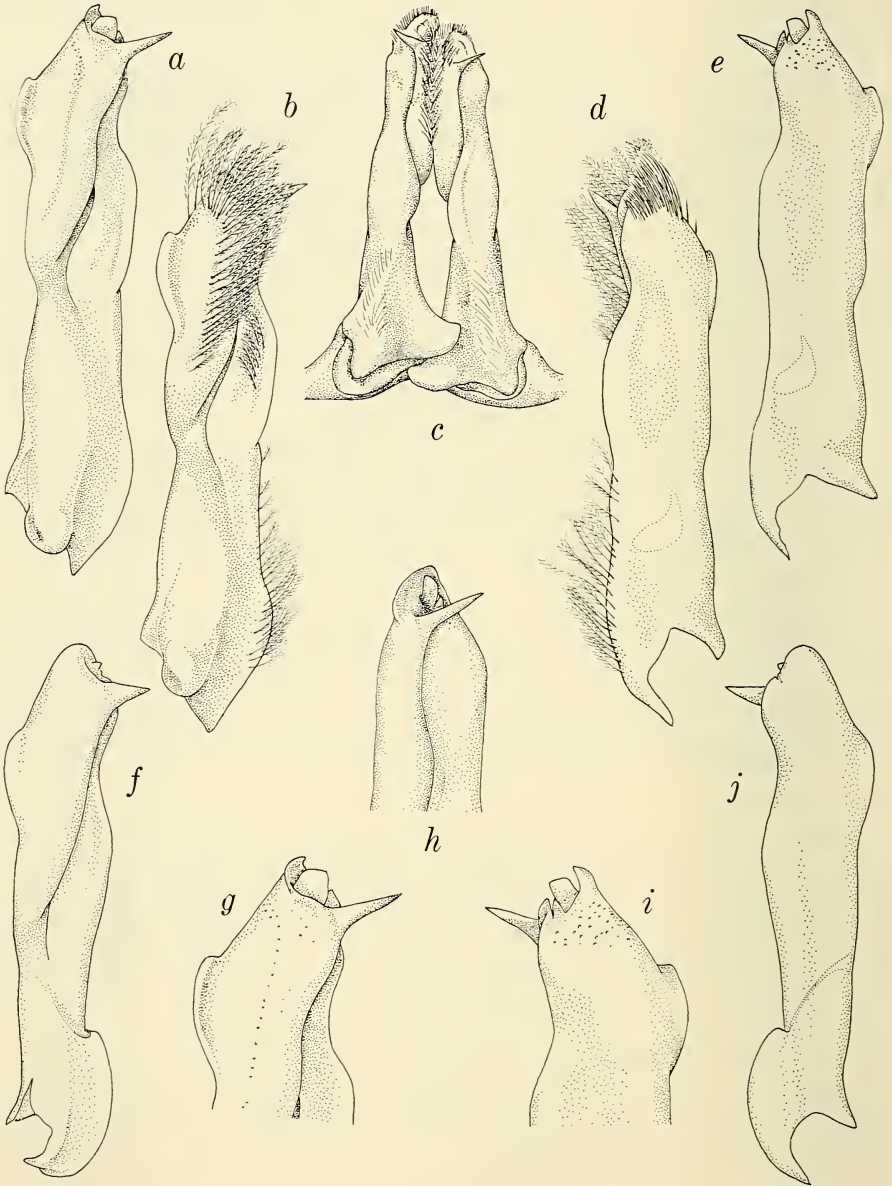


Fig. 2. *Procambarus* (*Scapulicambarus*) *strenthi* (all illustrations from holotype except *f* and *j* from morphotype): *a*, *b*, *f*, *g*, Mesial view of left first pleopod; *c*, Caudal view of first pleopods; *d*, *e*, *i*, *j*, Lateral view of left first pleopod; *h*, Caudal view of distal part of left first pleopod.

Uropod with both lobes of basal podomere bearing short acute spines; mesial ramus with distomedian spine situated far proximal to distal margin.

Allotypic female.—Differing from holotype in following respects: cervical tubercle distinctly spiniform; cephalic lobe of epistome subtriangular with 1 or 2 acute or subacute prominences on cephalolateral borders; fixed finger of chela (Fig. 1i) with 5 tubercles along opposable margin; corresponding margin of dactyl with single row of 8 tubercles, two rows not distinguishable; single row of minute denticles on both fingers; merus of cheliped with 9 tubercles in ventromesial row, 7 in ventrolateral row, and 2 lying between distal members of rows.

Annulus ventralis (Fig. 1d) as described in "Diagnosis." Sternum immediately cephalic to annulus with low rounded tubercles on each side of median line. Postannular sclerite broadly arched cephalically and almost straight caudally, almost as long and four-fifths as wide as annulus. First pleopod reaching cephalic margin of annulus when abdomen flexed. (See Table 1.)

Morphotypic male, form II.—Differing from holotype in following respects: acumen barely overreaching base of ultimate podomere of antennular peduncle; cervical tubercle not larger than others nearby; cephalic section of telson with 2 spines in caudosinistral corner and 3 in caudodextral; cephalic lobe of epistome subtriangular with spine near midlength of both cephalolateral margins; opposable margin of fixed finger of chela with large, more ventral tubercle situated at base of distal third of finger; opposable margin of dactyl with 7 tubercles in dorsal row and 5 in ventral; band of minute denticles on both fingers narrower; carpus of cheliped with acute tubercle on dorsomesial distal angle; merus of right cheliped with 2 spiniform preterminal tubercles dorsodistally, 13 tubercles in ventromesial row, 9 in ventrolateral row, and 2 lying obliquely between distal members of rows; hooks on ischia of third and fourth pereopods much reduced, neither reaching basioischial articulation.

First pleopod (Fig. 2f, j) with juvenile basal suture marked by unsclerotized area; shoulder on cephalic surface less well defined than in holotype and rounded distally; terminal elements all recognizable but, except for mesial process, less sharply defined; mesial process more robust and directed at right angle to shaft of appendage.

Type-locality.—Small stream 15 mi (24 km) W of Ciudad Valles, San Luis Potosí, Mexico. According to Dr. Strenth, there the clear, spring-fed stream, with a maximum width of about 5 m, flows through a small valley with a moderately swift current. The stream bed, with steep banks, is littered with rocks, and pools as much as 1.5 m in depth, alternate with riffles. The crayfish were obtained at night from the quieter waters just upstream from a riffle area. (This is also the type-locality of the shrimp

Table 1. Measurements (mm) of *Procambarus* (*Scapulicambarus*) *strenthi*.

	Holotype	Allotype	Morphotype
Carapace			
Height	11.4	9.4	9.3
Width	11.7	9.5	9.1
Total length	24.3	20.2	20.0
Postorbital length	19.1	15.9	15.6
Areola			
Width	0.9	0.8	1.0
Length	8.3	6.9	6.9
Rostrum			
Width	4.4	3.7	3.5
Length	6.5	5.6	5.1
Chela			
Length of mesial margin of palm	7.6	4.3	4.6
Width of palm	6.4	3.6	3.5
Length of lateral margin	20.0	10.0	12.1
Length of dactyl	10.6	4.7	6.2
Abdomen			
Width	10.9	9.5	8.7
Length	26.8	23.7	21.1

Palaemonetes mexicanus Strenth (1976:7), and of the gastropod *Pachychilus apheles* Thompson (1967:26).) Infesting the types was the entocytherid ostracod *Ankylocythere toltecaae* Hobbs (1971:36).

Disposition of types.—The holotype, allotype, and morphotype are deposited in the National Museum of Natural History (Smithsonian Institution), nos. 147725, 147726, and 147727, respectively, as are the paratypes consisting of 1♂ form I, 1♂ form II, and 1♀.

Size.—The largest specimen available is the holotype (see Table 1).

Range and specimens examined.—Known only from the type-locality, 1♂ II, 1♀ with young, 14 March 1974, N.E.S., coll.; 2♂ I, 1♂ II, 1♀, 29 May 1974, T.G.L., coll.

Variations.—Except for the presence of multiple cervical spines (3 on right and 2 on left) in the paratypic male, form I, and the single one in the paratypic female being so small as to be hardly recognizable, the variations noted in the paratypes are not noteworthy; even the numbers and distribution of tubercles on the cheliped are within the limits described in the primary types.

Life history notes.—The allotypic female was carrying young when collected on March 14; 34 juveniles in the second instar were clinging to her abdomen when she was preserved.

Relationships.—This crayfish is allied to the five previously described members of the subgenus *Scapulicambarus*: *P. (S.) clarkii* (Girard, 1852), *P. (S.) howellae* Hobbs, 1952, *P. (S.) okaloosae* Hobbs, 1942, *P. (S.) paeninsulanus* (Faxon, 1914), and *P. (S.) troglodytes* (LeConte, 1856). Although somewhat distantly related to them, it shares fewer characters with *P. (S.) clarkii* and *P. (S.) troglodytes* than with the other three. It may be distinguished from all of them by the deep punctations on the dorsal surface of the carapace, the broader rostrum with less convergent margins, the broader antennal scale, and especially by the features of the first pleopod. The latter is conspicuously more setose than in any of the others, and the cephalic process is unique in forming a gently curved lamelliform plate flanking the cephalic part of the central projection. In possessing a tuberculate sternum cephalic to the annulus ventralis, it resembles *P. (S.) okaloosae* and *P. (S.) paeninsulanus*; however, in them the tubercles overhang (ventrally) the cephalic margin of the annulus.

Etymology.—This crayfish is named in honor of its original collector, Ned E. Strenth, who has donated a number of specimens of crayfishes and palaemonid shrimps to the Smithsonian Institution.

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